Greenhouse Gas Emissions, Imported Fossil Fuels and Nuclear Power

California State Assemblyman
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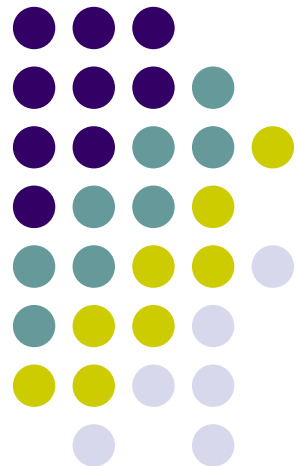


Greenhouse Gas Emissions Reduction Mandates

- AB 32 mandate: reduce greenhouse gas (GHG) emissions by 25 percent in 12 years, then another 80 percent by 2050
- The first 25% will not be reached, the second 80% would place our per capita emissions on the level with Somalia or the wood-burning Colonial era U.S.
- Transportation generates about 51 percent of California's lifecycle CO_2 emissions, electricity about 20 percent
  - Eliminate all cars by 2020 and AB 32 fails
  - Eliminate all electricity by 2020 and AB 32 fails

Greenhouse Gas Emissions Reductions: Inconvenient Facts

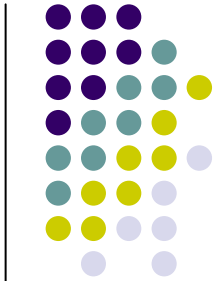
- Most conservation measures are incremental: new construction impacts a tiny fraction of the existing residential and commercial stock
- Renewables are not necessarily helpful for GHG reductions
  - Corn ethanol is destroying Brazilian rain forest as soybean production has shifted from the U.S., it is also starving people in the third world and causing unrest
  - To generate the same amount of energy, wind power consumes 10 times the cement and steel as does nuclear
  - Solar power generates about 155g of CO_2/kWh lifecycle vs. 20g for nuclear

Greenhouse Gas Emissions Reductions: Follow the CO_2

- About 39 percent of direct U.S. GHG emissions are from the electrical sector of which about 80 percent is due to coal
- Transportation accounts for 31 percent of direct U.S. GHG emissions
- First step: replace coal and natural gas with nuclear, use solar thermal for peaking power needs on hot days
- Second step: replace oil and natural gas with electric and hydrogen made by clean electricity
- To truly make an impact, the U.S. grid should mirror France's: more than 90 percent nuclear and hydro

*Perspective: One year's economic growth in China equals **ALL** of California's greenhouse gas emissions while in 15 years, China will emit **DOUBLE** the greenhouse gas emissions of America.*

The Reliable Baseload Challenge

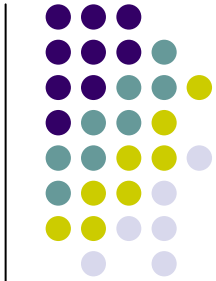


- California consumption can peak at 40,000 mW, with a low of 21,000 mW
- Today's baseload is coal, hydro, nuclear and natural gas, should be hydro and nuclear
- Peak demand is met by natural gas and hydro, should be hydro and solar
- Alternatively, build more nuclear than needed for baseload and use nighttime power to charge vehicle batteries and make hydrogen
- Wind is periodic and must be backed by gas

A Nuclear Solution

- Using a full lifecycle calculation, the electrical generation sector in California emitted about 99 million metric tons of CO_2 in 1990 and 139 million metric tons of CO_2 in 2006, a 40% increase
- Building 4-5 new, safe, clean and reliable reactors will allow the electrical sector to meet its AB 32 goals by 2020
- Building 9-10 reactors reduces CO_2 emissions 25.5 million metric tons below target, freeing up credits for other sectors of the economy

Energy Independence and Economic Benefit



- Energy independence
  - In 2006, the U.S. imported 3,462 billion cubic feet of natural gas for $24 billion
  - San Onofre saves 188 billion cubic feet of natural gas yearly worth $1.3 billion (2007 prices)
- Economic benefit
  - A 1,600 mW modern nuclear plant can be built for $4 billion and save about $1 billion yearly in gas running on about $30 million in fuel
- Safe storage of spent fuel costs about $0.005/kWh, reprocessing about $0.01/kWh

Political Impact of AB 32 and Energy Policy

- Oil at $120 per barrel angers voters
- Corn ethanol is not a solution – political blame will be cast on politicians and environmentalists who advocated it
- Natural gas prices will likely double and with 42 percent of California's electricity produced by natural gas, electrical rates will increase 30 percent within the year – this reduces support for costly environmental measures

Perspective: California is not an island; we are the most electrically efficient state, pushing production of goods and services elsewhere hurts the California economy AND the environment.

Relative Risks

- The risks associated with modern nuclear power and spent fuel disposal or reprocessing must be compared to the risks (greenhouse gas, pollution, and national security) of continued use of coal, oil and natural gas
- Coal may prematurely kill 30,000 Americans every year
- Higher energy costs displace other beneficial expenditures, such as healthcare, education and housing while aggravating poverty impacts

Closing Thought

“Nuclear power has to be part of the solution. Can we really understand the notion of risk? Nuclear plants versus carbon emissions -- which will kill and has killed more people?”

- John Hennessy, President, Stanford University